available to data collection personnel. The reliability audit and casefinding study described in this report are conventional quality control activities for tumor registries (Hilsenbeck 1990).

The experience with computerized edits that also may be regarded as a part of the quality control process for data submitted from tumor registries is not included in this report, as it is not within the purview of the Quality Control Unit of the CCR. These computerized edits are under the aegis of the CCR's Statistical Unit. The quality control activities reported here are consistent in style and format with the precedent of other central cancer registries, and with the Surveillance, Epidemiology and End Results (SEER) program of the National Cancer Institute (NCI) (Hilsenbeck 1990; SEER 1991).

RELIABILITY STUDY

In 1991, the Quality Control Unit undertook a study to assess the skills of the data collection personnel supplying data to the CCR, both tumor registrars and medical records personnel of the incidence reporting hospitals alike. Four standardized test charts were prepared from actual patient charts. A panel of physicians and Certified Tumor Registrars (CTRs) abstracted these records, and discrepancies between panel members were resolved by consensus.

The sample charts were mailed to data collection personnel in all hospitals throughout the state. These personnel were instructed to abstract the four charts using the CCR Incidence Report form and return these forms to the CCR within four weeks. CCR staff coded the primary site and morphology items and entered them into a simulated database. In total, the sample charts were abstracted by 89 persons: 29 tumor registrars; 58 personnel from incidence reporting hospitals; and two CCR field staff members. Facility-specific results from the analyses were sent to each participating tumor registrar. For incidence reporting hospitals, the reliability study results were used by the CCR field staff during individual site visits.

Results of the Reliability Study

Differences between the coding performance of the medical records personnel versus the tumor registrars were evaluated using the chi-square test. The chi-square statistic measures the comparison between groups as the proportion of responses defined as accurate by the consensus panel.

Overall, the accuracy of reporting was high for the demographic section and for submissions from tumor registrars. For tumor registrars and non-registrars respectively, the overall accuracy rates [percentages] for the four charts were rectosigmoid 93.1 and 83.4; lung 87.3 and 80.8; breast 89.4 and 78.9; and lymphoma 84.9 and 62.5 (Figure 3). This pattern of errors is consistent with the difficulty of the cases. The sample chart for cancer of the lung contains information that is expressly subtle regarding this complex anatomic site. Lymphomas are generally regarded as very complex cases to abstract because of the fluid nature of the tumor and the intricate staging considerations applied to this site. The item-specific errors are presented for each participant group (tumor registrars and medical records personnel of incidence reporting hospitals) and for each of the four sample charts in Tables 1-4 respectively.

There were three focal areas of demographic classification errors. Generally the medical records personnel (non-registrars) were often in error on ethnicity, place of birth and sequence number. Of these data items, errors with ethnicity were the most reflective of systematic misclassification or failure to classify (Figure 4). The order of the codes on the abstract form may have contributed to this error (i.e., not-of-hispanic-origin is code #2).

Both the tumor registrars and the medical records personnel showed considerable variation in determining the fourth digit of the primary site code (Figure 5). At the major three-digit rubric level [usually used in research analyses], accuracy was